Amendment to the Claims

Cancel claims 1-20.

Add claims 21-39 as follow.

(new)

21. A method for objectively assessing speech quality comprising the steps of:

detecting distortions in an interval of speech activity using envelope information; and

modifying an objective speech quality assessment value associated with the speech activity to reflect the impact of the distortions on subjective speech quality assessment.

(new)

22. The method of claim 21, wherein the step of modifying includes the step of determining the objective speech quality assessment values for the speech activity.

(new)

23. The method of claim 21, wherein the distortions being detected are impulsive noise, abrupt stop or abrupt start.

(new)

24. The method of claim 21, wherein the step of detecting includes the step of determining a distortion type.

(new)

25. The method of claim 24, wherein the distortion type is determined to be impulsive noise if the envelope information indicates that the speech activity can be perceived by a human listener to be noise and if the interval is of a duration long enough to be perceived by a human listener but not too long for a short burst.

(new)

26. The method of claim 24, wherein the distortion type is determined to be impulsive noise if the envelope information indicates that the speech activity can be perceived by a human listener to be noise, if a ratio of the objective speech quality assessment value to a modulation noise reference unit indicates a human listener would perceive annoying noise, and if the interval is of a duration long enough to be perceived by a human listener but not too long for a short burst.

(new)

27. The method of claim 24, wherein the objective quality assessment value associated with the speech activity is modified in accordance with the following equation to obtain a modified objective quality assessment value if the distortion type is impulsive noise:

$$\tilde{v}_s(m) = \frac{v_s(m)}{1+\exp\left[-8.2(m-m_I)/e(l_I)-10\right]}$$

where $v_s(m)$ is the objective quality assessment value and $\tilde{v}_s(m)$ is the modified objective quality assessment value.

(new)

28. The method of claim 24, wherein the distortion type is determined to be abrupt stop if the envelope information indicates that there was an sufficient negative change in frame energy from one frame to another to be considered an abrupt stop and if the interval is of a duration longer than a short burst.

(new)

29. The method of claim 24, wherein the distortion type is determined to be abrupt stop if the envelope information indicates that a maximum frame envelope had sufficient energy prior to ending the interval, and if the interval is of a duration longer than a short burst.

(new)

30. The method of claim 24, wherein the objective quality assessment value associated with the speech activity is modified in accordance with the following equation to obtain a modified objective quality assessment value if the distortion type is impulsive noise:

$$\tilde{v}_s(m) = |\Delta e(l_M)| \left[\frac{6}{1+\exp[-2(m-m_M-3]} - 6 \right]$$

where $v_s(m)$ is the objective quality assessment value and $\tilde{v}_s(m)$ is the modified objective quality assessment value.

(new)

31. The method of claim 24, wherein the distortion type is determined to be abrupt start if the envelope information indicates that there was an sufficient positive change in frame energy from one frame to another to be considered an abrupt start and if the interval is of a duration longer than a short burst.

(new)

32. The method of claim 24, wherein the distortion type is determined to be abrupt stop if the envelope information indicates that a maximum frame envelope had sufficient energy towards a beginning of the interval, and if the interval is of a duration longer than a short burst.

(new)

33. The method of claim 24, wherein the objective quality assessment value associated with the speech activity is modified in accordance with the following equation to obtain a modified objective quality assessment value if the distortion type is impulsive noise:

$$\tilde{v}_s(m) = \frac{v_s(m)}{1+\exp[-0.4(m-m_S)/\Delta e(l_S)-10]}$$

where $v_s(m)$ is the objective quality assessment value and $\tilde{v}_s(m)$ is the modified objective quality assessment value.

(new)

34. The method of claim 21 comprising the additional step of:

prior to the step of detecting, determining the interval of speech activity using the envelope information.

(new)

35. An objective speech quality assessment system comprising:

means for detecting distortions in an interval of speech activity using envelope information; and

means for modifying an objective speech quality assessment value associated with the speech activity to reflect the impact of the distortions on subjective speech quality assessment.

(new)

36. The objective speech quality assessment system of claim 35, wherein the means for modifying includes a means for determining the objective speech quality assessment values without accounting for distortions for the speech activity.

(new)

37. The objective speech quality assessment system of claim 35, wherein the distortions being detected are impulsive noise, abrupt stop or abrupt start.

(new)

38. The objective speech quality assessment system of claim 35, wherein the means for detecting includes a means for determining a distortion type.

(new)

39. The objective speech quality assessment system of claim 38, wherein the means for detecting includes a voice activity detector for detecting intervals of speech activity, wherein the means for determining a distortion type examines intervals of speech activities detected by the voice activity detector.